

What is claimed is:

1. An imaging device comprising:
an optical plate made of an optically transparent material and forming a surface to receive a finger;
a first light source positioned to illuminate the finger receiving surface;
an imaging system positioned to receive light collected from the finger receiving surface and to form an image of a fingerprint pattern of a finger on the finger receiving surface; and
a second light source to direct a light beam to the finger receiving surface to determine whether an object on the finger receiving surface is real or fake.
2. The device of claim 1 wherein the light beam from the second light source has a central axis that is normal to the finger receiving surface.
3. The device of claim 1 wherein the light beam from the second light source has a central axis that is inclined at an angle from normal relative to the finger receiving surface.
4. The device of claim 1 in which an image area of the light beam from the second light source is substantially less than the surface area of the finger receiving surface.
5. The device of claim 4 in which the diameter of the image area of the light beam from the second light source is between about one and three millimeters.

6. The device of claim 1 in which the second light source is selected from the group consisting of a light-emitting diode, a laser and a laser diode.

7. The device of claim 1 in which the optical plate has a second surface parallel to the finger receiving surface, the second light source being located below the second surface of the optical plate.

8. The device of claim 7 in which the first light source is positioned at the second surface of the optical plate.

9. The device of claim 7 further including a reflective surface positioned at a third surface of the optical plate to collect light from the finger receiving surface and to focus the collected light on the imaging system.

10. The device of claim 9 in which the imaging system is positioned at a fourth surface of the optical plate.

11. The device of claim 9 in which the reflective surface is a converging mirror, a diverging mirror or an array of microreflectors.

12. The device of claim 1 in which the imaging system comprises:

an aperture at a second surface of the optical plate;
an objective at the aperture; and

a detector to receive light collected by the aperture and the objective.

13. The device of claim 12 in which the imaging system comprises a reflective surface positioned between the objective and the detector for collecting light from the objective and for focusing the light onto the detector.

14. The device of claim 12 in which the detector comprises a CCD.

15. The device of claim 12 in which the detector comprises a CMOS sensor.

16. The device of claim 12 in which the aperture defines an aperture beam of light rays used by the detector.

17. An imaging device comprising:

an optical plate made of an optically transparent material and forming a surface for receiving a finger;

a first light source positioned to illuminate the finger receiving surface;

a second light source to direct a light beam toward the finger receiving surface to form an image of limited area at or near the finger receiving surface; and

an imaging system positioned to receive light from the finger receiving surface and to form an image of a fingerprint pattern of a finger on the finger receiving surface, the imaging system configured and operable to locate the position of the image formed by the second light source along an axis of the finger receiving surface and to compare that position to a predetermined reference value to determine whether an object on the finger receiving surface is real or fake.

18. The device of claim 17 wherein the predetermined reference value is stored in memory and is the position of an

image formed along the axis of the finger receiving surface by a real finger, and further including a predetermined offset value stored in memory that is the approximate difference between the predetermined reference value and the position of an image formed along the axis of the finger receiving surface by a fake or false finger.

19. The device of claim 18 wherein the imaging system further includes a processor to compare the predetermined reference value to the position of the image formed by the second light source along the axis of the finger receiving surface to generate a measured offset value that is compared to the predetermined offset value to determine whether the object on the finger receiving surface is real or false.

20. An imaging device comprising:

an optical plate made of an optically transparent material and forming a surface for receiving a finger;

a light source to direct light to the finger receiving surface to form an image of limited size at or near the finger receiving surface to determine whether an object on the finger receiving surface is real or fake; and

an imaging system positioned to receive light collected from the finger receiving surface to locate the position of the image formed by the light source along an axis of the finger receiving surface and to compare that position to a predetermined reference value to determine whether an object on the finger receiving surface is real or fake.

21. The device of claim 20 wherein the imaging system is configured and operable to form an image of a fingerprint pattern of a finger on the finger receiving surface.

22. An imaging device comprising:

an optical plate made of an optically transparent material and forming a surface for receiving a finger;

a first light source positioned to illuminate the finger receiving surface;

a second light source to direct a light beam toward the finger receiving surface to form an image of limited area at or near the finger receiving surface; and

an imaging system positioned to receive light from the finger receiving surface and to form an image of a fingerprint pattern of a finger on the finger receiving surface, the imaging system including means for locating the position of the image formed by the second light source along an axis of the finger receiving surface and comparing that position to a predetermined reference value to determine whether an object on the finger receiving surface is real or fake.

23. A method of imaging a fingerprint, the method comprising:

receiving an object at a finger receiving surface of an optical plate made of an optically transparent material;

illuminating the finger receiving surface with a light source to form an image of limited size at or near the finger receiving surface;

collecting light from the finger receiving surface; and

receiving the collected light at an imaging system to locate the position of the image along an axis of the finger receiving surface and to compare it to a predetermined reference value to determine whether the object on the finger receiving surface is a real or fake.

24. A method of imaging a fingerprint, the method of comprising:

collecting light from the finger receiving surface; and receiving the collected light at an imaging system to form an image of a fingerprint pattern of a finger based on the received light.

26. The method of claim 24 wherein the object is determined to be real only if the difference between the predetermined reference value and the measured position of the image along the axis of the finger receiving surface is less than a predetermined offset value.

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